GDR1.0 General Design Requirements

GDR1.1

Requirement: In order to ensure compatibility with major development efforts in industry and academia, and to avoid duplication of effort, the System will adhere to Internet and W3C standards.
Priority: 1.
Source: World
Cognizance: IU, JPL, USC
Status:
Verification: Review

GDR1.2

Requirement: The user interface shall be extensible to allow new application components to be added as needed.
Priority: 1
Source: World
Cognizance: IU
Status:
Verification: Addition of application component successful

GDR1.3

Requirement: The system shall adhere to the following standards: WSDL, WSIL, SOAP, WS-SEC.
Priority: 1
Source: World
Cognizance: IU
Status:
Verification: Review

GDR1.4

Requirement: The system shall provide distributed access and control methods for earthquake simulations application (**http://www.servogrid.org/slide/GEM/Interop/AWS.doc**)
Priority: 1
Source: World
Cognizance: IU
Status:
Verification: Review

GDR1.5

Requirement: The functionality of the system shall include but not be limited to job submission, job monitoring, file transfer, session management, and security.
Priority: 1
Source: World
Cognizance: IU
Status:
Verification: Successful implementation of all components

GDR1.6

Requirement: The aforementioned functionality shall be supported on multiple backend resources that are managed through a single browser interface, as outlined in: (**http://www.servogrid.org/sllide/GEM/Interop/AWS.doc**)
Priority: 2
Source: World
Cognizance: IU
Status:
Verification: Demonstration through single browser interface

GDR1.7

Requirement: The system shall provide methods to dynamically configure data flow between component applications.
Priority: 1
Source: World
Cognizance: IU, JPL, USC
Status:
Verification: Successful dynamic configuration

GDR1.8

Requirement: All resources will be assigned an URI for unique identification.
Priority: 1
Source: World
Cognizance: IU, JPL, USC
Status:
Verification: Existence of appropriate URI

GDR1.9

Requirement: The system must adhere to standards from Grid Forum and related bodies.
Priority: 1
Source: IU, JPL

Cognizance: IU
Status:
Verification: Documented adherence to applicable standards

GDR1.10

Requirement: The system design shall allow the easy integration of third-party web services.
Priority: 2
Source: World
Cognizance: IU
Status:
Verification: Successful integration of a third party web service

GDR1.11

Requirement: All initial Web Service implementation will be designed to move to OGSA (Open Grid Service architecture) as the latter specification matures.
Priority: 2
Source: IU, JPL
Cognizance: IU
Status:
Verification: Successful implementation in OGSA

GDR1.12

Requirement: The system shall provide information services needed to locate specific backend resources.
Priority: 1
Source: World
Cognizance: IU
Status:
Verification: Demonstration of location of back end resources

UBR1.10 User-Based Requirements

UBR1.1

Requirement: All earthquake simulation applications shall be deployed in an accessible environment.
Priority: 1
Source: World
Cognizance: IU, JPL, Brown, UCD, USC
Status:
Verification: Demonstration

UBR1.2

Requirement: The system shall be accessible through all standard browsers (Netscape 4 and later, IR 5 and later).
Priority: 1
Source: World
Cognizance: IU, JPL
Status:
Verification: Test and demonstration of function in all browsers

UBR1.3

Requirement: The system shall dynamically create user interfaces based on the service interfaces provided by the application manager.
Priority: 1
Source: World
Cognizance: IU, JPL, USC
Status:
Verification: Demonstration

UBR1.4

Requirement: Users shall be able to customize their interfaces by composing their system views from the user interfaces to the services that interest them.
Priority: 2
Source: World
Cognizance: IU
Status:
Verification: Review

UBR1.5

Requirement: The system will provide the user the ability to select desired system resources.
Priority: 1
Source: World
Cognizance: IU
Status:
Verification: Review

UBR1.6

Requirement: The user interface will allow the user to integrate job submittal, input preparation, and visualization activities.
Priority: 1

Source: World
Cognizance: IU
Status:
Verification: Review

UBR1.7

Requirement: The system shall provide context sensitive help.
Priority: 2
Source: World
Cognizance: IU
Status:
Verification: Demonstration

ADR1.0 Application Developer-Based Requirements

ADR1.0

Requirement: The system shall easily allow application developers to add and manage their applications.
Priority: 2
Source: Developers
Cognizance: IU, JPL
Status:
Verification: Successful addition and management by developer

ADR1.2

Requirement: As applications mature and change, the system shall allow the application manager to update the invocation interfaces.
Priority: 1
Source: Developers
Cognizance: IU, JPL
Status:
Verification: Successful update of interface

DH1.0 Data Handling

DH1.1

Requirement: The system shall be capable of handling distributed heterogeneous datasets.
Priority: 1

Source: World
Cognizance: IU, JPL, UCI, USC
Status:
Verification: Demonstration of access of multiple distributed datasets

DH1.2

Requirement: The system shall provide seamless data access such that the location of the data and method of storage is transparent to the user.
Priority: 2
Source: JPL, Brown, IU, UCD, UCI, USC
Cognizance: JPL, USC, IU
Status:
Verification: Data access from multiple sources through a single web page

DH1.3

Requirement: Dynamically generated database queries based on user input.
Priority: 1
Source: JPL, UCI, Brown, UCD, SCEC
Cognizance: JPL, USC, UCI
Status:
Verification: Test

DT1.0 Data Types

DT1.0

Requirement: Data types the system will support, but are not limited to the following: GPS position time series, GPS station velocities, InSAR difference maps, seismicity, and faults.
Priority: 1
Source: JPL, Brown, UCD, SCEC
Cognizance: UCI, GSC, SCEC
Status:
Verification: Access of all mentioned data types

DT1.2

Requirement: Data types the system may support include, but are not limited to the following: Rheological structure, and simulation archive.
Priority: 2
Source: JPL, UCI, Brown, UCD, SCEC
Cognizance: UCI, GSC, SCEC
Status:

Verification: Access of all mentioned data types

DT1.3

Requirement: Data types the system may support include, but are not limited to the following: laser strain, borehold strain, and gravity.
Priority: 3
Source: JPL
Cognizance: JPL, Caltech, SCEC
Status:
Verification: Access of all mentioned data types

SB1.0 Supported Back-ends

SB1.1

Requirement: Application codes will be supported by the following platforms: UNIX, LINUX clusters, SGI Origin, Alpha, SP3.
Priority: 1
Source: JPL, Brown
Cognizance: Individual investigator
Status:
Verification: Complies and matches test suite

SB1.2

Requirement: Application codes may be supported by the following platforms: Windows.
Priority: 2
Source: JPL, UCD
Cognizance: Individual investigator
Status:
Verification: Compiles and matches test suite

P1.0 Performance

P1.1

Requirement: The system configuration shall employ high-speed datalinks.
Priority: 3
Source: JPL, UCD
Cognizance: JPL
Status:
Verification: Test

P1.2

Requirement: The system configuration shall employ low-latency job scheduling.
Priority: 1
Source: JPL, UCD, Brown, UCI
Cognizance: IU
Status:
Verification: Sanguine investigator

P1.3

Requirement: The PARK code shall execute on 104 CPU machine with 400,000 elements, 50,000 time steps in the same time as the baseline code.
Priority:
Source: Brown
Cognizance: Brown
Status:
Verification: Demonstration

P1.4

Requirement: GeoFEST shall link to PYRAMID and shall execute on a parallel machine.
Priority:
Source: Brown
Cognizance: Brown
Status:
Verification: Demonstration

P1.5

Requirement: GeoFEST shall execute on a 880 CPU processor machine (assuming availability) with 16M elements and 1000 time steps in the same time as the baseline code using the Pyramid AMR libraries.
Priority:
Source: JPL
Cognizance: JPL
Status:
Verification: Demonstration

P1.6

Requirement: Virtual California shall execute with N=700 segments for 10,000 times steps in 1 hour or less with MPI parallel implementation, running on M-

processor machine with 2 GB of memory per CPU, an a speedup of approximately M/2 on up to 256 processors.
Priority:
Source: UCD
Cognizance: UCD
Status:
Verification: Demonstration

P1.7

Requirement: Performance will be monitored, measured, and documented.
Priority: 1
Source: JPL
Cognizance: JPL, UCD, Brown
Status:
Verification: Demonstration

A1.0 Applications

A1.1

Requirement: The system will provide the capability to run the following application codes: GEOFEST, PARK, DISLOC, SIMPLEX, VC, DAHMM, PDPC.
Priority: 1
Source: JPL, MIT, UCD
Cognizance: JPL
Status:
Verification: Demonstration

C1.0 Collaboration capabilities

C1.1

Reference: The system will provide the capability for application codes to access real-time data streams.
Priority: 2
Source: World
Cognizance: IU
Status:
Verification: Successful test

C1.2

Reference: The system will provide tools to visualize output data from application codes.
Priority: 2
Source: World
Cognizance: IU, JPL, Brown
Status:
Verification: Demonstration

C1.3

Reference: The system will provide the capability for users to collaborate in real-time on model development.
Priority: 2
Source: World
Cognizance: IU, JPL
Status:
Verification: Demonstration of collaboration

S1.0 Security

S1.1

Reference: The system shall provide user authentication, access control, message integrity, and communication privacy.
Priority: 1
Source: IU
Cognizance: IU
Status:
Verification: Review

S1.2

Reference: The system shall have multiple user roles: application user, application manager, system manager.
Priority: 1
Source: IU
Cognizance: IU
Status:
Verification: Review

S1.3

Reference: The application user will be allowed to use all available system services defined in GDR1.5, unless disallowed by system managers.
Priority: 1

Source: IU
Cognizance: IU
Status:
Verification: Review

S1.4

Reference: Application managers shall have user rights and shall also be allowed to create and modify application interfaces as permitted by system managers.
Priority: 1
Source: IU
Cognizance: IU
Status:
Verification: Review

S1.5

Reference: System managers shall have all rights of users and application managers, plus additional rights as described above.
Priority: 1
Source: IU
Cognizance: IU
Status:
Verification: Review

E1.0 Errors

E1.1

Reference: The system shall log the time, location and nature (if known) of all service call failures.
Priority: 1
Source: IU
Cognizance: IU
Status:
Verification: Documentation